

REMARKS

Claims 1-47 were pending when last examined, of which Claims 10, 11, 13-23, 31, and 36-41 are withdrawn. Claims 1, 3, 4, 6-8, 24, 25, and 29 are amended, and Claims 12 and 32 are canceled.

Claim Objections

Claim 25 was objected to for reciting “wherein a third spacer” The objected phrase has been deleted and the objection is overcome.

Claim Rejections – 35 USC 102

Claim 1 is rejected under 35 USC 102(e) as being anticipated by U.S. Patent No. 6,705,584 to Hiroshima (“Hiroshima”).

Claim 1 is patentable over Hiroshima at least because it recites that “each of the second spacers has a prism shape or an elliptical column shape, the prism shape having an approximately triangular cross section with three surfaces wherein one of the three surfaces is substantially perpendicular to a liquid crystal injection direction, and the elliptical column shape having an elliptical cross section with a long axis that is parallel to the liquid crystal injection direction.” Hiroshima discloses a liquid crystal display device with columnar spacers. As shown in Hiroshima’s figures (e.g., Figures 3, 4, and 5), Hiroshima’s columnar spacers have circular cross sections. Hiroshima’s column 11, lines 28-35 states the following:

Although the columnar spacers SP1, SP2, SP3 of this embodiment are depicted such that all of them have the circular cross section (a horizontal cross section), the cross-sectional shapes of these columnar spacers should not be limited to such a circular shape. The columnar spacer may have e.g. a columnar shape having an elliptical cross section, a rod-like shape having other cross section, a frustum of a cone or a rectangular pyramid.

There is no teaching or suggestion of a spacer having a prism shape, and no teaching or suggestion of a spacer having a prism shape where one of the surfaces is substantially perpendicular to the liquid crystal injection direction. The design and orientation of the spacers recited in Claim 1 have many benefits. For example, as stated in the section of the application titled Embodiment 18, one of the surfaces of the prism shape being positioned perpendicularly to the liquid crystal injection direction (so that an edge of the triangular prism extends outward) facilitates liquid crystal injection by reducing the friction between the spacers and the liquid crystal material. At the same

time, the spacers reduce the likelihood that the liquid crystal material that is already injected will leak because the friction between the spacers and the liquid crystal material flowing outward is increased. Thus, compared to a columnar spacer of the type that is disclosed in Hiroshima, the invention of claim 1 reduces or prevents liquid crystal leakage without compromising the ease with which the liquid crystals are injected.

Similarly, Hiroshima does not disclose or suggest spacers having an elliptical column shape *wherein the long axis is parallel to the liquid crystal injection direction*. It is advantageous to use the spacer that is shaped and oriented in this manner because the long axis being parallel to the liquid crystal injection direction reduces the friction during the injection of the liquid crystal material. Thus, the invention of Claim 1 allows spacers to be used near the liquid crystal injection site without significantly compromising the efficiency at which the liquid crystals are injected.

For the reasons stated above, Claim 1 is patentable over Hiroshima.

Claim Rejections – 35 USC 103

Claims 2-7, 12, 24-30, 32, and 35 are rejected under 35 USC 103(a) as being unpatentable over Hiroshima.

Claims 2-6 depend from Claim 1, which is patentable over Hiroshima for the reasons stated above. There is no teaching or suggestion in Hiroshima that its columnar spacers may be made with an approximately triangular cross section. Similarly, there is no teaching or suggestion in Hiroshima that the columnar spacers should be oriented a certain way. In fact, as Hiroshima's main concern is to compensate for deformation of the sealing material, there is no suggestion that the spacers should be designed or oriented to facilitate liquid crystal injection or reduce likelihood of leakage.

As for Claim 7, it is patentable over Hiroshima at least because it recites that "a width of the liquid crystal inlet is in a range of about 11 mm to about 20 mm, a number of the second spacer is plural, a first distance between the second spacers is in a range of about 1.5 mm to about 2.0 mm, and a second distance between the second spacer and an edge of the liquid crystal inlet is in a range of about 0.5 mm to about 1.5 mm." Hiroshima does not disclose a width of the liquid crystal inlet, whether there is more than one second spacer, a specific first distance between the second spacers, or a specific second distance between the second spacer and an edge of the liquid crystal inlet, as stated on pages 5-6 of the Office Action mailed on December 15, 2005 ("the

Office Action”). Claim 7 is rejected on the basis of an official notice (see page 6 of the Office Action) that it would have been obvious for a person of ordinary skill in the art to position the spacers in the manner recited in Claim 7. However, this is an inappropriate basis for a rejection as no documentary evidence is provided to support this statement.

According to MPEP 2144.03, official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art, are capable of instant and unquestionable demonstration as being well-known. In this case, it cannot be instantly and unquestionably demonstrated that “a first distance between the second spacers [being] in a range of about 1.5 mm to about 2.0 mm” and “a second distance between the second spacer and an edge of the liquid crystal inlet [being] in a range of about 0.5 mm to about 1.5 mm” was well-known at the time the application was filed.

MPEP 2144.03 states that if official notice is taken of a fact, unsupported by documentary evidence, the technical line of reasoning underlying the conclusion must be clear and unmistakable. In this case, no reasoning has been provided as to why the first distance of about 1.5 mm to about 2.0 mm and the second distance of about 0.5 mm to about 1.5 mm would be well-known. The Office Action states that “if the density of the second spacers is high, which is the second spacers spaced apart from each other less than 1.5 mm, the injecting liquid crystal process has to take more time to fill up the cell gap ... on the other hand, if the density of the second spacers is low, which is the second spacers spaced apart from each other more than 2.0 mm, the gap near the injection inlet could be bent and therefore resulting in defective filling process.” However, there is no explanation as to why the numbers 1.5 mm and 2.0 mm are used to define high spacer density and low spacer density, respectively. Without an explanation as to why these particular numbers were chosen as the appropriate boundaries for spacer density, it appears as though whatever numbers the applicant claimed would have been stated as the numbers that define the high and low spacer densities. For example, had the applicant chosen to claim a range of about 1.0 mm to about 1.5 mm for the first distance, the official notice would have stated that 1.0 mm and 1.5 mm (instead of 1.5 mm and 2.0 mm) define the boundaries of appropriate spacer distance. Without an explanation or documentary support as to why the distances 1.5 mm and 2.0 mm are obvious, the rejection of Claim 7 appears arbitrary.

For the reasons stated above, Applicant respectfully submits that the official notice that is taken in reference to Claim 7 is inappropriate. Hiroshima does not disclose or suggest distances between spacers, and therefore Claim 7 is patentable over Hiroshima.

Claim 12 is canceled.

Claim 24 is patentable over Hiroshima at least because it recites that “each of the second spacers has a prism shape or an elliptical column shape, the prism shape having an approximately triangular cross section with three surfaces wherein one of the three surfaces is substantially perpendicular to a liquid crystal injection direction, and the an elliptical column shape having an elliptical cross section with a long axis that is parallel to the liquid crystal injection direction.” As stated above in reference to Claim 1, Hiroshima does not teach or suggest a spacer having a prism shape or a surface of the prism shape being substantially perpendicular to the liquid crystal injection direction. Nor does Hiroshima teach or suggest an elliptical column with its long axis oriented parallel to the liquid crystal injection direction. Hence, Claim 24 is patentable over Hiroshima.

Claims 25-28, 30, and 35 depend from Claim 24 and are therefore patentable over Hiroshima for the same reason as Claim 24.

Claim 29 is patentable over Hiroshima at least for the same reason that Claim 7 is patentable over Hiroshima.

Claim 32 has been canceled.

Claims 8, 9, 33, and 34 are rejected under 35 USC 103(a) as being unpatentable over Hiroshima in view of U.S. Patent Application Publication No. 2002/0176046 to Kitamura (“Kitamura”).

Claims 8 and 9 depend from Claim 7, which is patentable over Hiroshima and Kitamura at least because it recites that “a width of the liquid crystal inlet is in a range of about 11 mm to about 20 mm, a number of the second spacer is plural, a first distance between the second spacers is in a range of about 1.5 mm to about 2.0 mm, and a second distance between the second spacer and an edge of the liquid crystal inlet is in a range of about 0.5 mm to about 1.5 mm.” As stated above in reference to Claim 7, the Office Action states that Hiroshima does not disclose a width of the liquid crystal inlet, whether there is more than one second spacer, a specific first distance between the second spacers, or a specific second distance between the second spacer

and an edge of the liquid crystal inlet. Likewise, Kitamura, which discloses a sealant composition for a plastic liquid crystal cell, does not disclose the width of the liquid crystal inlet, the number and types of spacers, or distances between spacers or spacer and the edges. Thus, Claims 8 and 9 are patentable over a combination of Hiroshima and Kimura.

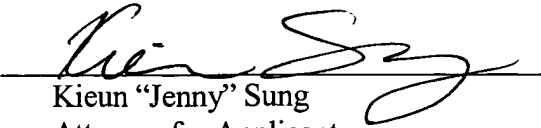
Claims 33 and 34 depend from Claim 24, which recites that “each of the second spacers has a prism shape or an elliptical column shape, the prism shape having an approximately triangular cross section with three surfaces wherein one of the three surfaces is substantially perpendicular to a liquid crystal injection direction, and the an elliptical column shape having an elliptical cross section with a long axis that is parallel to the liquid crystal injection direction.” As stated above, Hiroshima does not teach or suggest second spacers having a prism shape, second spacers having a surface that is substantially perpendicular to a liquid crystal injection direction, or an elliptical column shape having a log axis of the ellipse that is parallel to the liquid crystal injection direction. Likewise, Kimura, which discloses the composition of a sealant, does not disclose these details about spacers. Thus, Claims 33 and 34 are patentable over a combination of Hiroshima and Kimura.

For the foregoing reasons, Claims 1-9, 24-30, and 33-35 are now in condition for their allowance. Please telephone the undersigned attorney at (650) 833-2121 if there are any questions.

Respectfully submitted,

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